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1. A hydrogel precursor composition comprising:
 - (a) a polymer, said polymer comprising a water soluble polymer domain with at least two hydrophobic interacting groups attached thereto, said polymer capable of assembling into a hydrogel under physiological conditions; and
 - (b) a physical chemical protecting group, said physical chemical protecting group preventing gel formation of said hydrogel precursor composition.
2. A hydrogel or hydrogel precursor composition comprising:
 - (a) a polymer, said polymer comprising a water soluble polymer domain with at least two hydrophobic interacting groups attached thereto, said polymer capable of assembling into a hydrogel under physiological conditions;
 - (b) a physical chemical protecting group, said physical chemical protecting group preventing gel formation of said hydrogel precursor composition or hydrogel; and
 - (c) a molecule that disrupts an interaction between said physical chemical protecting group and said hydrophobic interacting groups.
3. The hydrogel precursor composition of claim 1, wherein said polymer domain comprises poly(ethylene glycol), poly(vinyl alcohol), poly(vinyl pyrrolidone), poly(ethyl oxazoline), poly(acrylic acid), poly(acrylamide),

poly(styrene sulfonate), poly(amino acids), polysaccharides, or copolymers thereof.

4. The hydrogel precursor composition of claim 1, wherein said chemical protecting group is β -cyclodextrin.

5. The hydrogel precursor composition of claim 1, wherein said hydrophobic interacting groups are positioned at the termini of said polymer domain.

6. The hydrogel precursor composition of claim 1, wherein said hydrophobic interacting groups are positioned within said polymer domain.

7. The hydrogel precursor composition of claim 1, wherein said hydrophobic interacting groups are hydrocarbons.

8. The hydrogel precursor composition of claim 5, wherein said hydrocarbons are perfluorinated hydrocarbons.

9. The hydrogel precursor composition of claim 1, wherein said physical chemical protecting group is a cyclodextrin.

10. The hydrogel precursor composition of claim 1, wherein said physical chemical protecting group is a molecule that covalently binds to said hydrophobic interacting groups.

11. The hydrogel precursor composition of claim 10, wherein said molecule that covalently binds to said hydrophobic interacting groups is hydrophilic.

12. The hydrogel precursor composition of claim 1, wherein said polymer domain comprises poly(ethylene glycol) and said hydrophobic interacting groups are perfluorinated hydrocarbons.

13. The hydrogel or hydrogel precursor composition of claim 2, wherein said molecule that disrupts an interaction between said physical chemical protecting group and said hydrophobic interacting groups is a molecule that binds to said physical chemical protecting group better than said hydrophobic interacting groups binds to said physical chemical protecting group.

14. A method for forming a hydrogel in contact with a tissue, said method comprising the steps of:

- (a) providing a solution, said solution comprising a polymer, said polymer comprising a water soluble polymer domain having at least two hydrophobic interacting groups attached thereto, said polymer capable of assembling into a hydrogel under physiological conditions, and a physical chemical protecting group, said physical chemical protecting group preventing gel formation of said polymer;
- (b) providing a molecule that disrupts an interaction between said physical chemical protecting group and said hydrophobic interacting groups;
- (c) combining said solution with said molecule that disrupts an interaction between said physical chemical protecting group and said hydrophobic interacting groups to form a mixture, wherein prior to, during, or after said combining, said solution and said molecule that disrupts an interaction between said physical chemical protecting group and said hydrophobic interacting groups are contacted with a tissue; and
- (d) allowing gel formation of the solution of the mixture of step (c) in contact with said tissue.

15. A method for forming a hydrogel in contact with a tissue, said method comprising the steps of:

- (a) providing a solution, said solution comprising a polymer, said polymer comprising a water soluble polymer domain having at least two hydrophobic

interacting groups attached thereto, said polymer capable of assembling into a hydrogel under physiological conditions, and a water soluble organic solvent, said organic solvent preventing gel formation of said polymer;

- (b) removing all or part of said organic solvent from said solution, wherein prior to, during, or after said removal, said solution and said organic solvent are contacted with a tissue; and
- (c) allowing gel formation of the solution of step (b) in contact with said tissue.

16. A method for forming a hydrogel in contact with a tissue, said method comprising the steps of:

- (a) providing a solution, said solution comprising a polymer, said polymer comprising a water soluble polymer domain having at least two hydrophobic interacting groups attached thereto, said polymer capable of assembling into a hydrogel under physiological conditions, and a water soluble organic solvent, said organic solvent preventing gel formation of said polymer;
- (b) contacting said solution with a tissue; and
- (c) allowing gel formation of said solution in contact with said tissue.

17. A method for incorporating a sensitive biological material into a hydrogel composition, said method comprising the steps of:

- (a) providing a solution, said solution comprising a polymer, said polymer comprising a water soluble polymer domain having at least two hydrophobic interacting groups attached thereto, said polymer capable of assembling into a hydrogel under physiological conditions, and a physical chemical protecting group, said physical chemical protecting group preventing gel formation of said polymer;
- (b) providing a molecule that disrupts an interaction between said physical chemical protecting group and said hydrophobic interacting groups;
- (c) providing a sensitive biological material, wherein said sensitive biological material is combined with either said solution of step (a) or said molecule that disrupts an interaction between said physical chemical protecting group and said hydrophobic interacting groups of step (b);
- (d) combining said solution with said molecule that disrupts an interaction between said physical chemical protecting group and said hydrophobic interacting groups and said sensitive biological material to form a mixture; and
- (e) allowing gel formation of the mixture of step (d).

18. A method for incorporating a sensitive biological material into a hydrogel composition, said method comprising the steps of:

- (a) providing a solution, said solution comprising a polymer, said polymer comprising a water soluble polymer domain having at least two hydrophobic

interacting groups attached thereto, said polymer capable of assembling into a hydrogel under physiological conditions, and a water soluble organic solvent, said organic solvent preventing gel formation of said polymer;

- (b) providing a sensitive biological material;
- (c) combining said sensitive biological material with said solution to form a mixture, wherein prior to, during, or after, said combining, all or part of said organic solvent is removed from said solution; and
- (d) allowing gel formation of the mixture of step (c).